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number of the present  $N_1$ 's who will live to enter their third year. The other terms of the numerator of formula (A) may be modified in similar manner, giving the formula

$$L = \frac{N_1 + \frac{B_1}{B_2} N_2 + \frac{B_1}{B_2} + N_3 \dots + \frac{B_1}{B_n} N_n}{N_1}, \quad (D)$$

which is applicable to all populations for which we have the following data: the number of individuals born each year since and including the year in which the oldest individuals now living were born, and the number of people of various ages now living.

While formula (D) has very wide applicability, its usefulness is greatly limited by the fact that it requires so large an amount of data which is usually difficult to obtain.

Before applying any of these formulæ it is necessary to eliminate the effect of immigration and emigration. This means that only those individuals should be considered whose whole life is to be spent as a part of the population under consideration. In using any of the methods here presented in determining the average rate of depreciation of, say, a farm implement of a given kind, only those implements are to be counted that were bought new (not second hand) and which will presumably be replaced when destroyed or worn out by new ones.

W. J. SPILLMAN

WASHINGTON, D. C.

#### QUARTER CENTENNIAL OF THE IOWA ACADEMY OF SCIENCE

ON Friday and Saturday, April 26-27, the Iowa Academy of Science celebrated the twenty-fifth anniversary of its organization. The sessions were held in the Art Gallery of the State Historical Building in Des Moines, beginning at 1:30 Friday afternoon. The president's address was given by Professor Louis Begeman, of the State Teachers College, on "The Mission and Spirit of the Pure Scientist." After the president's address the reading of the usual scientific papers as presented before the academy was the order of the afternoon. As forty-six titles were presented, it was necessary that the time allotted to each paper be very brief.

The anniversary banquet was held Friday evening at the Chamberlain Hotel, with an attend-

ance of seventy. At the close of the banquet short addresses of congratulation were given by representatives of neighboring scientific societies. The Nebraska Academy of Science was represented by Professor Addison E. Sheldon, the Illinois Academy of Science by Professor Henry B. Ward, the Davenport Academy by Professor C. C. Nutting, the St. Louis Academy by Professor L. H. Pammel, the American Microscopical Society by Professors H. E. Summers and L. S. Ross and the Ohio Academy by Professor Herbert Osborn. An address on the "Charter Members" was given by Professor L. H. Pammel and the anniversary address by Professor Herbert Osborn, of the State University of Ohio, the first president of the Iowa Academy.

In accordance with the purpose of the anniversary meeting, the session Saturday forenoon was devoted to addresses on "The Development of the Sciences in Iowa during the Past Twenty-five Years":

Botany—Professor Thomas H. Macbride.

Chemistry—Professor W. S. Hendrixson.

Geology—Professor M. F. Arey.

Physics—Professor Frank F. Almy.

Zoology—Professor C. C. Nutting.

These papers gave valuable reviews of the status of the sciences in the colleges at the time of the organization of the academy, and historical sketches indicating marked advance in all scientific lines during the quarter century.

At the business meeting, over eighty applications for membership were presented. The meeting was in every way fitting to celebrate the end of a quarter century of earnest and effective work done by the academy.

The 1913 meeting will be held at the Iowa State College, Ames.

#### TITLES OF PAPERS PRESENTED

(Abstracts furnished by authors)

*Ferns and Liverworts of Grinnell and Vicinity:* H. S. Conard.

*Secotium warnei, a Stalked Puffball:* H. S. Conard.

*Simblum rubescens in Iowa:* H. S. Conard.

*Aroid Notes:* James Ellis Gow.

In studying the morphology of some twenty species of Aroids, mostly tropical, the writer found that there is great confusion in the nomenclature of the species. A reference to the original sources has made it possible to give a correct account of the taxonomy of all but one species, and the results are here presented.

*Behavior of Pollen Tubes in Richardia Africana:*  
James Ellis Gow.

*An Anomalous Ovary:* James Ellis Gow.

*The Late Blight of Barley—Helminthosporium teres Sacc.:* A. L. Bakke.

*Some Points on the Floral Development of Red Clover (Trifolium pratense):* J. N. Martin.  
Introduced by L. H. Pammel.

*Native Dye-plants and Tan-plants of Iowa with Notes on a Few Other Species:* Harriette S. Kellogg.

*The Genus Lycoperdon as Represented in the Herbarium of the State University of Iowa:*  
N. D. Knupp.

*Notes on Heteranthera dubia:* R. B. Wylie.

*Notes on Some Parasitic Fungi Chiefly from the Bitter Root Mountains:* L. H. Pammel and Ella Grace Harvey.

*The Effect of Continued Grinding on the Water of Crystallization* (second paper): Nicholas Knight.

*The Dynamics of the Reaction between Ethyl Iodide and Silver Nitrate in Ethyl and Methyl Alcohol and in Mixtures of these Solvents:*  
O. M. Weigle and J. N. Pearce.

*The Solubility of Lead Sulphate in Aqueous Solutions of Sulphuric Acid:* P. A. Jans and J. N. Pearce.

*The First Reported American Lepidostrobis from Warren County, Iowa:* John L. Tilton.

The paper records the discovery of the specimen, the conditions under which it had been preserved and evidences that in other places may lead to the discovery of specimens of equal interest. It was illustrated by the specimen itself and by lantern slides of prepared sections.

*Nether Delimitation of our Carbonic Rocks:*  
Charles R. Keyes.

Singularly enough the base of the Carbonic rocks in Iowa has never been definitely recognized; neither has the top of the Devonian sequence. The present paper records the facts recently discovered which go to show that there is a marked unconformity between the two great formations. This basal terrane of the Carbonic strata is the Grassy black shale of Missouri, which has always been regarded as of Devonian age. Its northern continuation proves to be the Sweetland shale of Muscatine County.

*Arid Plateau Plains as Features of Eolic Erosion:*  
Charles R. Keyes.

One of the great difficulties in the consideration

of eolic erosion has been the securing of quantitative data, and direct proofs that supposable examples are not possibly the results of stream-corrasion. These proofs are believed to be found in the lava-capped mesas of excessively dry regions.

*Sundry Provincial and Local Phases of the General Geologic Section of Iowa:* Charles R. Keyes.

Certain features of the stratigraphy of the state are briefly discussed in the light of recent advances in geologic classification. The present need appears to be a careful revision of the nomenclature of the geologic formations now recognized and a detailed study of certain of the larger groups with a view to properly subdividing them.

*The Salem Limestone and its Stratigraphic Relations in Southeastern Iowa:* Francis M. Van Tuyl.

Recent stratigraphic studies have suggested that a limestone member formerly regarded as the basal portion of the St. Louis is distinctly formational in character and is of the horizon of the Salem limestone of Illinois and Indiana. Unconformities occur both at the base and at the top of the formation.

*The Origin of the Geodes of the Keokuk Beds:*  
Francis M. Van Tuyl.

Previous theories of the origin of the geodes are briefly discussed and evidence is presented to show that these theories are untenable. The presence in the beds at some localities of calcareous nodules grading into geodes suggests a method of geodization not previously recognized.

*A Study in the Cherts of the Osage Series of the Mississippian System:* Francis M. Van Tuyl.

Cherty nodules and bands are prominent features of the Burlington and Keokuk limestone members of this series. Excellent facilities for studying the chert were recently afforded in the power-plant excavation at Keokuk. In the discussion of the origin of the material it is concluded that it has resulted from the metasomatic replacement of the limestone.

*A Method of Teaching Elementary Mineralogy:*  
G. F. Kay.

*A Survey of the Water-bearing Gravels at Estherville, Emmet County, Iowa:* G. G. Wheat.

*Additional Evidence of Unconformity between the Cedar Valley and Lime Creek Stages of the Devonian of Iowa:* A. O. Thomas.

The type outcrop showing unconformity is described; several similar outcrops are noted. A

new substage, tentatively called the Floyd limestone, is added at the base of the Lime Creek stage.

*Some Notes on the Aftonian Mammals:* A. O. Thomas.

A number of interesting mammalian bones and teeth have been added to the State University collection during the past year. They are chiefly remains of the elephant, horse and camel. The finding of the lower jaw of a beaver adds a new genus to this remarkable faunal assemblage.

*Early Iowa Locality Records:* B. Shimek.

A discussion of the early Iowa plant, mollusk and insect records in the earlier reports, such as those of the Lewis and Clark, Long, Nicollet and Owen expeditions. Also a discussion of the "Council Bluff," Nebraska, records which are sometimes thought to refer to Council Bluffs, Iowa.

*The Phase Difference at the Ears Produced by a Simple Source of Sound:* G. W. Stewart.

*A New Laboratory Apparatus for Measuring Time, Independent of Clock or Chronograph:* F. C. Brown.

*Evidence Favoring the Chemical Disintegration of Sodium as an Element:* F. C. Brown.

*The Effect of Mechanical Rupture on the Electrical Conductivity of Selenium:* F. C. Brown.

*A Method of Determining Whether the Restoring Torque is Proportional to the Torsional Strain during the Vibration of a Torsional Pendulum:* L. P. Sieg.

*The Influence of an Electric Current upon the Elasticity of Wires:* H. L. Dodge.

*A Simple Laboratory Equipment for the Elementary Study of Alternating Currents:* H. L. Dodge.

*On the Dissimilarity of Light and Heat Action in a Certain Variety of Selenium:* E. O. Dieterich.

*Mollusca of Iowa:* T. Van Hyning.

*A Study in Insect Parasitism:* R. L. Webster.

An account of certain insect parasites reared from the common tomato-worm, *Phlegethontias sexta* Johanssen, the relations of these parasites to the host and to each other, and their comparative abundance, etc.

*A Systematic Study of the Reduviidae of North America:* S. B. Fracker.

*Notes on a Collection of Mammals from Northwestern Iowa:* Alexander G. Ruthven and Norman A. Wood.

*Contributions to the Herpetology of Iowa—II.:* Alexander G. Ruthven.

*Food Habits of Red-tailed Hawk, Cooper's Hawk and Sparrow Hawk:* F. C. Pellett.

*The Interpretation of the Cardio-sphygmogram and the Electro-cardiogram, Normal and Pathological:* W. E. Sanders.

*The Source of the Chromaffine Cells in the Guinea-pig:* Mildred R. Yule.

*Notes on the Food of the Black-crowned Night Heron in Captivity:* B. H. Bailey.

*The Occurrence of Melanism in the Broad-winged Hawk:* B. H. Bailey.

*A Remarkable Flight of Broad-winged Hawks:* B. H. Bailey.

L. S. Ross,  
Secretary

### SOCIETIES AND ACADEMIES

THE PHILOSOPHICAL SOCIETY, UNIVERSITY OF VIRGINIA. MATHEMATICAL AND SCIENTIFIC SECTION

THE first meeting of the session 1912-13 of the Mathematical and Scientific Section was held September 23, 8:00 P.M. The following officers were elected:

*Chairman*—Professor Llewelyn G. Hoxton.

*Secretary*—Professor Wm. A. Kepner.

*Publication Committee*—Professors W. H. Echols, J. L. Newcomb and Thomas L. Watson.

The retiring chairman, Professor Thomas L. Watson, read by title a paper on "Kragite, a Rutile-bearing Rock from Krageros, Norway." Professor Watson read a second paper entitled "Vanadium and Chromium in Rutile and the Possible Effect of Vanadium on Color."

Professor R. M. Bird reported observations made along New River, Virginia to North Carolina.

WM. A. KEPNER,  
Secretary

UNIVERSITY OF VIRGINIA

THE ELISHA MITCHELL SCIENTIFIC SOCIETY

THE 200th meeting of the society was held October 15 in Chemistry Hall, University of North Carolina, Professor E. V. Howell presiding. The following new members were elected: Professor H. W. Chase and Mr. J. S. Holmes. The following papers were read:

"Chemical Control of Industrial Plants," by Dr. C. H. Herty.

"The Water Molds of Chapel Hill," by Dr. W. C. Coker.

JAMES M. BELL,  
Recording Secretary

CHAPEL HILL, N. C.